

On the Ultimate Analysis of Vegetable and Animal Substances. By Andrew Ure, M.D. F.R.S. Read June 27, 1822. [*Phil. Trans.* 1822, p. 457.]

Dr. Ure commences this paper by adverting to the fallacies to which the modes of analysing organic substances hitherto practised are subject; and in detailing the peculiar methods adopted in his own researches, he shows the means of obviating them, and of diminishing the various sources of inaccuracy to which these complicated processes of analytical chemistry are necessarily more or less liable. Where oxide of copper is used, its hygrometric quality has generally been overlooked, or not duly allowed for; and the animal and vegetable substances have not in general been exposed to any process of desiccation sufficiently exact or uniform; the author therefore always used the oxide of copper in some known or ascertained degree of humidity; and he dried the organic bodies in the air-pump vacuum, aided by the absorbent powers of a surface of sulphuric acid in the apparatus, and with precautions which he fully describes. He then details the best means of applying heat for the decomposition of organic substances, and describes a drawing representing the construction of his furnace, and other implements. Lastly, he points out the method of examining the results and products, and gives in detail the analysis of sulphuric ether, as illustrating the mode of computing the relations of the constituents, while the results of the other analyses are, for the sake of brevity, thrown into a tabular form. Dr. Ure concludes his paper with some general remarks on the analytical details. In respect to sugar, he observes, that on comparing pure crystalline sugar with diabetic sugar, the latter exhibits a notable excess of oxygen; and he considers weak sugars (as the refiners call them), in general, to exhibit the same peculiarity.

In applying the atomic theory to his experimental results, the author enlarges on the different views which may be taken of the ultimate constitution of a variety of organic products, and enters at considerable length into details relating to the vegetable acids, with a view of determining with exactness their prime equivalents, and the relative proportions of combined water which they contain in their crystalline states.

The Croonian Lecture. Microscopical Observations on the Suspension of the Muscular Motions of the Vibrio tritici. By Francis Bauer, Esq. F.R.S. F.L.S. and H.S. Read December 5, 1822. [*Phil. Trans.* 1823, p. 1.]

The *Vibrio tritici* is a small worm which infects wheat, being the immediate cause of that destructive disease called Ear Cockle, or Purples. Upon examining the grains thus diseased, the author found them to be the unimpregnated germens, containing masses of a white and apparently gluey mucus, which might be removed in the shape of a firm ball, and which, when immersed in water, and viewed

through the microscope, displayed hundreds of minute worms in lively motion. When these worms had become perfectly dry, and apparently entirely lifeless, they again recovered upon being moistened with a drop of water, and were as lively as before.

To determine the origin of these animals, Mr. Bauer undertook a series of experiments, which convinced him that the spawn or eggs were conveyed into the cavities of the germens by the circulating sap. In these experiments he inserted some of the worms into sound grains of wheat, suffered them to germinate, and found the worms in different stages of their growth in the stalk, and ultimately in the germens.

The largest of these worms was one fourth of an inch long, and one eightieth of an inch in diameter; their head is armed with a moveable proboscis, and the tail ends in a claw-like point; at a small distance from which, on the inferior side, is an orifice, from which they discharge their eggs in strings of five or six, adhering to each other. Each egg is about $\frac{3}{8}$ th of an inch long, and $\frac{1}{8}$ th, or $\frac{1}{10}$ th in diameter; and if attentively examined, they are transparent enough to allow of the young worm being seen within, which, in about an hour and a half after the egg is laid, extricates itself. These worms exhibit no external distinctions of sex, and the author considers them to be hermaphrodites.

The first specimens of these worms which Mr. Bauer examined, were from grains twelve months old, and consequently perfectly dry. He, however, also succeeded in recovering them by immersion in water, from wheat which had been kept five years and eight months; but the longer the specimens were kept, the longer were the worms obliged to be immersed in water, to enable them to recover their muscular motions. The longest period of its suspension which he had observed, was six years and one month; after that time they seemed perfectly dead.

Alternately moistened and dried in a watch-glass, these worms might be preserved alive for several weeks; and if kept continually moist, they remained alive for three months; but if dried at the end of that period, they do not again recover, but become quite straight, and remain unaltered in the water for more than fourteen months, when they gradually decay. Their extraordinary preservation, and these various circumstances, Mr. Bauer refers to the mucous-like water in which they are enveloped, and which appears to be of an oily nature.

The author concludes this paper with an abstract of the description of these worms given by other writers, and of their opinions respecting their origin.

On Metallic Titanium. By W. H. Wollaston, M.D. V.P.R.S. Read December 12, 1822. [*Phil. Trans.* 1823, p. 17.]

Small cubic crystals are occasionally met with in the slag of iron furnaces, which, from being imbedded in sulphuret of iron, have been